current in Cabot Strait between New Foundland and Cape Breton Island is southward; but an eddy or countercurrent is shown running back northward along the western coast of New Foundland and then recurving into the main outward current from the Gulf. This eddy current would carry warm water northward, making a bight in the surface isotherms, and thus separating the Grand Banks from the Sable Island Banks by a tongue of higher temperature. Possibly there may be a circulation of water in the Bay of Maine whereby currents of warm water divide the Georges Shoals from the Sable Island Bank on the east and from the Nantucket Shoals on the west.

The deep narrow arms of the sea extending into the Bay of Maine and the Gulf of St. Lawrence from the south between these banks and shoals are suggestive of the possibility of such currents, and their effect would be to divide the waters of this region into thermal districts corresponding in general with the observed loci of fog maxima.

East and west the distribution of fog ought to follow pretty closely the variation of water temperatures, when the winds are southerly. But north and south the distribution will depend largely upon the winds which carry it along.

If the division of the fog belt into local maxima over the Nantucket and Georges Shoals and the Sable Island Bank is due to currents in the straits or narrow deeps between these shoals, the currents can not be continuous in time or constant in direction; for fog frequently extends across these deep straits making an unbroken belt; and in some months there is a maximum of fog occurrence directly over the large deep in the bays of Maine and Massachusetts, and also one over Cabot Strait deep. This would indicate a cessation or a reversal of the currents at times. The data at hand are not sufficient to show whether the shifting of fog from the shoals to the deeps and back again is systematic. In addition to the tendency of the fog belt to break up east and west into local areas which are not constant, except over the Grand Banks, there is a persistent tendency of the frequency to increase to the northward, the lines of equal percentage of frequency running east and west, with the line of maximum frequency skirting the coast of Maine and the Provinces close inshore. The Seewarte charts show an increase of frequency shoreward from 10 to 50 per cent in April, 10 to 60 per cent in May, and 10 to 70 per cent in June. In July the line of maximum frequency is somewhat offshore, decreasing both to the north and to the south. In every other month the percentage increases going north.

Undoubtedly the water is coldest where fog is most frequent; but the cause of the shifting about of the coldest water areas is not apparent.

In the opinion of Alexander Agassiz[9] the longitudinal cold bands at the surface of the Gulf Stream current "have no regularity, and only represent at any given moment the unceasing conflict going on between layers of water of different velocities and of different temperatures." Here the arctic current directly underruns the warm water from the Tropics. How far inshore the conflict extends can not be stated; but observations of ocean surface temperatures in the fog belt show considerable changes from day to day, and differences of several degrees on the same day between stations near each other.

Most fog banks are shallow, and the winds which contribute to their formation need to be substantially horizontal for considerable distances. The frequent lack of such horizontal air movement due to vertical components of motion (which are usually unnoticed), and the want of uniformity in the temperature and moisture relations of the offshore waters explain the apparent capriciousness of the Buzzards Bay summer fogs, which so impress the casual observer.

[9] Three Cruises of the *Blake*, p. 254.

Acknowledgments are due to the United States Commission of Fish and Fisheries, the United States Coast and Geodetic Survey, the United States Hydrographic Office, the United States Weather Bureau, and Mr. F. Lawrence Briggs, mate of the Vineyard Sound lightship, for data and references to sources of information.

A PHOTOGRAPH OF LIGHTNING AT HAVANA, CUBA.

By W. C. DEVEREAUX, Assistant Observer Weather Bureau, dated October 19, 1903.

I have the honor to forward a photograph of lightning taken in this city September 16, 1903, at 10:28 p. m. (Havana time), by Señor Jose Gomez, a professional photographer of this city. Señor Gomez states that the shutters of his camera had been open about five seconds when a very vivid flash of lightning compelled him to shut his eyes, and at the same time pressed the bulb which closed the shutters. He thinks that the two prominent streaks of lightning, shown in the picture, occurred either exactly together or within a fraction of a second of each other.

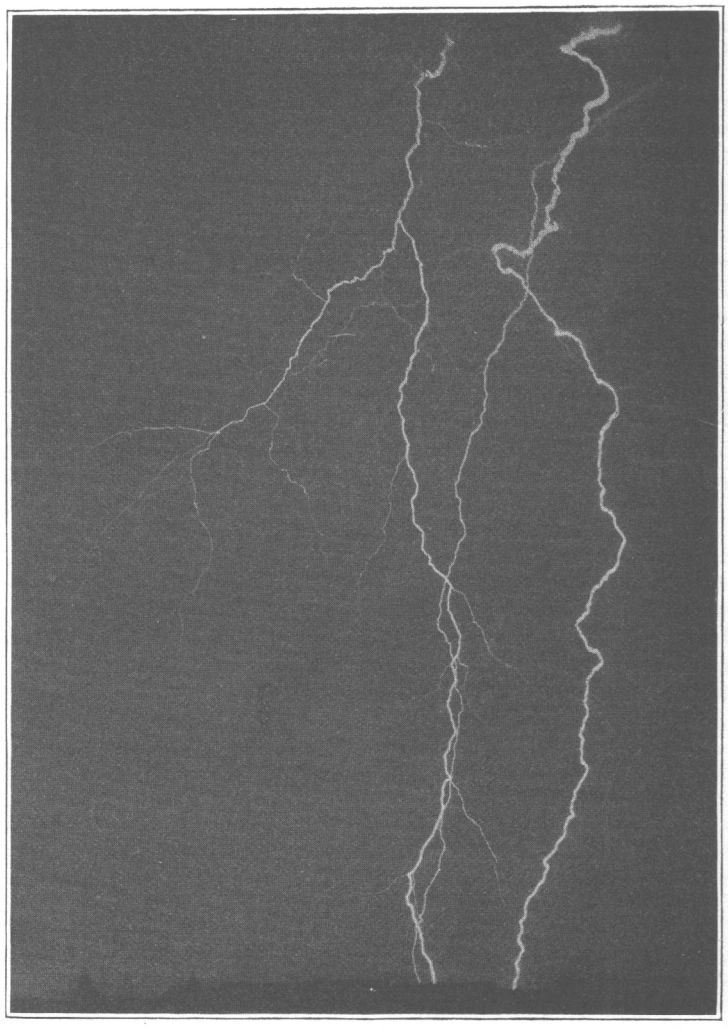

FIG. 1.—Two simultaneous flashes of lightning.

The following is the part of my journal which describes the storm of that evening:

Two very severe thunderstorms occurred late in the evening and at the same time. Thunder was first heard to the east at 9:35 p. m.; the center of this storm seemed to pass slightly to the northeast of the station, moving northwest. The first thunder of the second storm was heard to the southwest at 9:50 p. m.; the center of this storm seemed to pass over the western part of the city, moving north. The thunder from both storms was very loud from 10:30 p. m. to 10:50 p. m.; a light

rain began at 10:35 p. m.; about 10:50 p. m. the two storms seemed to meet over the sea to the north-northwest of the city, and from that time until after 11 p. m. the discharges of lightning to the northwest were very vivid and numerous, but the thunder was not as loud as it had been during the previous ten or fifteen minutes; heavy rain began at 10:57 p. m.; the wind, which had been light and generally east during the evening until 10:45 p. m., reached a maximum of 32 miles from the northeast between 10:55 p. m. and 11 p. m.

Most of the studies of lightning hitherto published have emanated from northerly regions. We are glad to publish this article from within the Tropics, where lightning is supposed to be most intense, and where special opportunities offer for studying its spectrum, its structure, and its physical peculiarities.—*C. A.*

E. O. NATHURST.

Biographical note by H. C. BATE, Local Forecaster and Section Director.

Mr. Einer Oswald Nathurst, Voluntary Observer, Tennessee section of the Climate and Crop Service of the Weather Bureau, died at his home in Tracy City, Tenn., Thursday, October 15, 1903, aged 69 years.

Mr. Nathurst was a native of Stockholm, Sweden, and came to America in 1854. For many years he was bookkeeper in Nashville, Tenn. In 1865 he went to Tracy City, and entered the service of the Tennessee Coal, Iron, and Railroad Company, and from that time until his last illness was connected with that company.

For the past seven years he had been a faithful and valued member of the corps of voluntary observers of the Tennessee section of the Climate and Crop Service. His work was characterized by a remarkable record of promptness and accuracy.

He was a man of very considerable scientific attainment in many branches, particularly in geology and mineralogy, which made him especially valuable, both as superintendent of the great coal mining industries at Tracy City, and also as a voluntary observer in the Weather Bureau, and the Service sustains a great loss in his passing away.

RECENT PAPERS BEARING ON METEOROLOGY.

Dr. W. F. R. PHILLIPS, Librarian, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——.

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Strutt, R. J. Radium and the Sun's Heat. P. 572.

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MacDowall, Alex. B. Our Winters in Relation to Brückner's Cycle. P. 600.

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Ellis, William. Mean Rainfall. P. 162.

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—— L'émanation radio-active de l'air atmosphérique. [Note on memoir by Elster and Geitel.] Pp. 389-390.

Debrowolski, A. Quelques idées sur la forme et sur la structure des cristaux de neige. Pp. 391-403.

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